

Atmos. Meas. Tech. Discuss., referee comment RC2
<https://doi.org/10.5194/amt-2022-307-RC2>, 2023
© Author(s) 2023. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on amt-2022-307

Anonymous Referee #2

Referee comment on "Stratospheric temperature measurements from nanosatellite stellar occultation observations of refractive bending" by Dana L. McGuffin et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2022-307-RC2>, 2023

The manuscript describes the retrieval of temperature profiles from stellar occultation measurements onboard nanosatellites and includes a detailed analysis of potential error sources. For the proof of concept, measurements from an imaging telescope and a star tracker onboard two non-dedicated nanosatellites operated by Terran Orbital were utilized. The results show a good agreement with the temperature profiles from MERRA2 reanalysis data in the lower 15-20 km of the atmosphere. Overall, the paper seems to be well suited for publication after minor revision, as detailed in the following:

- Title: The term "Observations of Stellar Occultation Bending" is very uncommon. I suggest "Stellar Occultation Measurements of Refractive Bending" or similar.
- Abstract: Line 2: What do you mean by "unlike other measurement techniques like radiosondes, aircraft, and radio occultation." These techniques can provide fine vertical profiles of atmospheric temperature too. Please clarify.
- Figure 2: Based on Declination and RA it seems that there is no overlapping area in both images. Adding a label for the brightest stars in both images would help to identify common points. In addition, Figure 2b requires a proper y-labeling, from -58° alone the scale of the image cannot be identified. Further suggestion: The external border of Figure 2b could be added to Figure 2a so that the overlapping area becomes clear.
- Figure 3: With the modifications suggested for Figure 2, Figure 3 is not necessary anymore.
- Line 189: How did you come up with a 3 – 8 km vertical resolution for the ST instrument?
- Line 200: Is there a special reason why ST observations were selected within the latitude range $26-34^\circ\text{S}$ only?
- Figure 4a,b, 5a,b and Figure 6: Labels and legend are difficult to read. Increase font size.
- Line 343: The first two sentences of the Conclusions start with "The technique ... presented here .." Please rephrase.
- Not sure if a vertical resolution of 3 m is possible given the expected diffraction-limit?